

SOCIETY MEETING OF MARCH 22, 1995

DEVELOPMENT TIMES FOR FORTY SPECIES OF COSTA RICAN STREAM INSECTS: IMPLICATIONS FOR SECONDARY PRODUCTION AND TEMPORAL VARIATION IN ABUNDANCE.

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While our general perception of a rainforest implies abundant rain and warmth, actually there is considerable variation in climate, vegetation and topography. Streams and rivers comprise vital components of the tropical ecosystem but have been little studied, particularly in the New World. Scientists at the Stroud Water Research Center, Academy of Natural Sciences of Philadelphia, have been interested in the role of disturbance and seasonality in the structure and function of temperate streams, and since 1990, have extended this interest into streams of the tropics. Dr. John Jackson, involved in this research since 1992, explained and summarized the findings to date at the Society's fourth meeting of the 1994-1995 season.

The Stroud Center studies have concentrated in an area of northwest Costa Rica, in tributaries of the Rio Tempisque, a Pacific drainage river. Unlike temperate streams, certain environmental factors such as water temperature and photoperiod are stable and allow researchers to pursue avenues of research difficult to investigate in temperate areas. Other characteristics like rainfall are not stable. Precipitation in the Rio Tempisque area amounts to 2.5-3 meters/year but this comes in pulses so that the aquatic life must deal conversely with flooding conditions and low flow during the year. Tied to this, the terrestrial vegetation is partly deciduous during the dry seasons, therefore varying the amount of leaf input, and the aquatic "vegetation", the periphyton, increases during stable flow periods. Because of the stable temperature and photoperiod, much of the initial research has focused on development times and life histories of the aquatic insects, using this as a base to examine other questions in population dynamics and secondary production. To achieve this, the Stroud Center researchers have relied on laboratory rearings (in controlled circumstances) of cohorts from individual egg masses and now have data for over 90 species in all major aquatic insect groups. Although this is a remarkable effort, the number of species reared doesn't come close to the over 300 species already found in the Rio Tempisque, many of these undescribed! Consequently, along with the rearing, the ecologists at the Stroud Center have had to form partnerships with systematists in the various groups to get their material identified and characterized.

Developmental times varied greatly among the stream insects, from 1-2 months for many chironomids, 3 months for some mayflies and caddisflies and over six months for certain stoneflies. A major explanation of the variability in development times is related to ultimate size of the insect. This basic knowledge of development times impacts directly on questions regarding disturbance. For example, the research has found that recoveries in numbers of insects following severe spates occurs in 3-4 weeks, yet the rearings indicate that life cycles are much longer; population recovery must occur in part from movement from refugia within the stream.

There were several entomological observations made at this early spring meeting. Howard Boyd discussed his finding in mid-March of two additional nesting aggregations of the bee *Colletes thoracicus* in Wharton State Forest, New Jersey. The newly discovered aggregations contained 200 and 350 burrows respectively in soft sand, with the aggregation discovered in 1992 also still active. Dale Schweitzer reported that increased butterfly activity has heralded the arrival of spring in southern New Jersey, including abundant orange sulfurs on March 12, and sighting six or more species of butterflies in each of the nine days leading up to this meeting. Indoor entomological pursuits were also discussed. Susan Whitney urged all to take advantage of the wonderful resources available through the computer via the World Wide Web, with entomological web sites popping up everywhere. Tommy Allen discussed collecting apterygotes locally, and noted that the apterygote collection at the University of Delaware has grown to over 10,000 slides in less than 4 years. There were 21 members and visitors at the meeting at the University of Delaware.

Jon Gelhaus,
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